Install your **future**

SYSTEM **KAN-therm**

Push

Service elements availability

Reliability and prestige

EN 22/01

∅ **12–32 mm**

SYSTEM **KAN-therm** Push

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1 General information

KAN-therm Push is a complete installation system consisting of PEXC, PERT polyethylene pipes and PPSU or brass fittings of diameters Ø12–32 mm.

KAN-therm Push joints are executed by pushing expanded pipe ending onto a fitting, and then by sliding a brass or plastic) ring onto such connection.

This technique does not require any additional sealants and guarantees perfect tightness and durability of the installation.

The system is designed for indoor water supply installations (hot and cold potable water) as well as heating installations.

It can also be used for the distribution of other types of media - please consult with KAN Technical Department.

The KAN-therm Push system are characterized by:

- guaranteed durability for over 50 years,
- resistance to scaling,
- resistance to hydraulic impacts,
- high smoothness of internal surfaces,
- physiological and microbiological neutrality in potable water installations,
- environmentally friendly materials,
- easy and quick assembly,
- impressive installation lightness,
- possibility of executing joints in construction partitions,
- effective anti-diffusion barrier.

2 Pipes in the KAN-therm Push

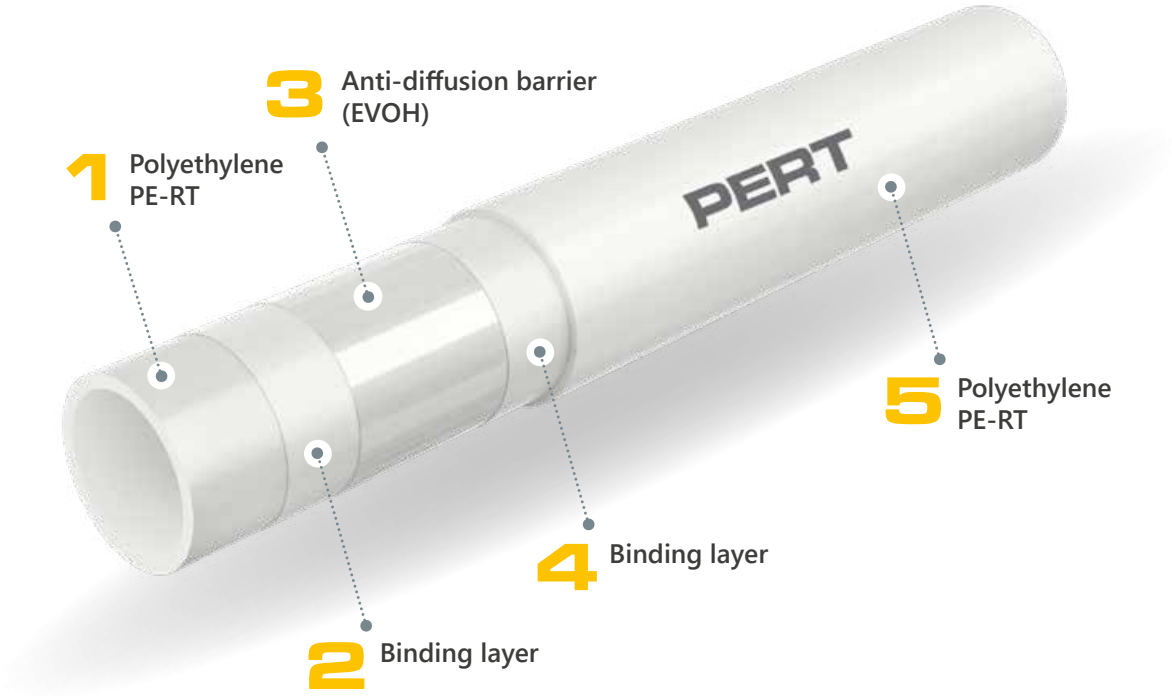
2.1 Pipe structure and material – physical properties

Due to economic and technical aspects, and the possibility of optimizing the scope of use, the KAN-therm Push system offers two types of polyethylene pipes with similar working parameters – PERT and PEXC pipes.

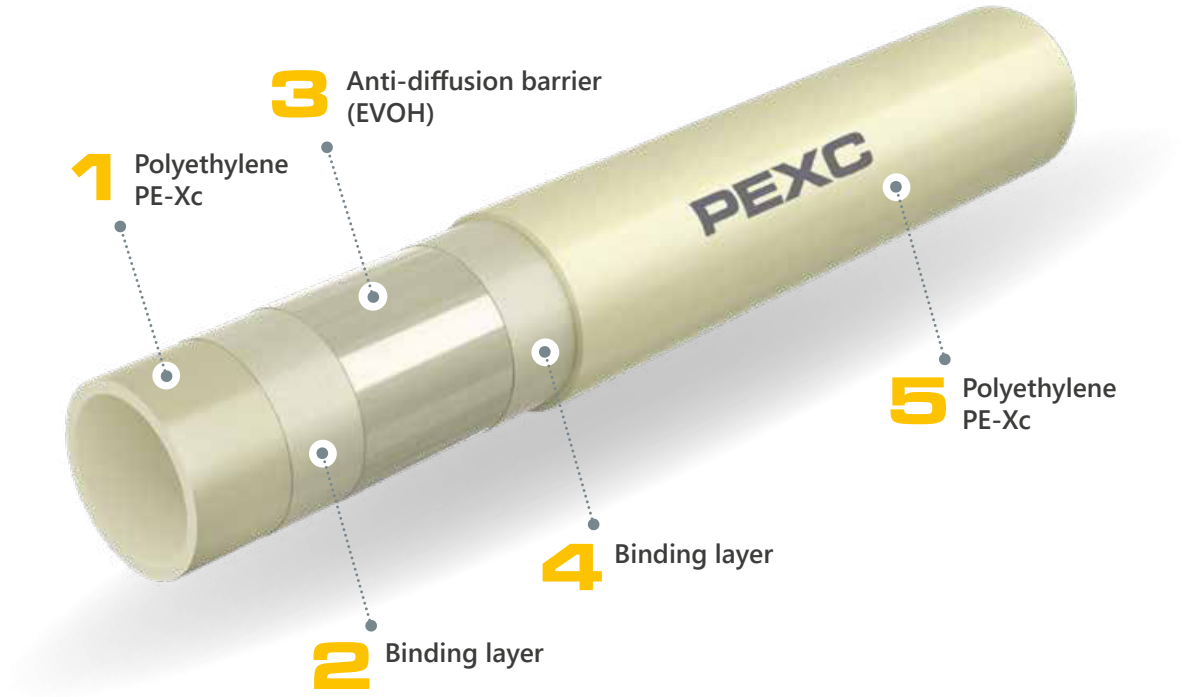
- **PERT pipes** are made of polyethylene PERT type II with increased thermal resistance and with excellent mechanical properties.
- **PEXC pipes** are manufactured of high density polyethylene cross-linked with a stream of electrons on a molecular level (the "c" physical method, without the use of chemicals). Polyethylene structure cross-linking results in achieving the most optimal and very high resistance to thermal, and mechanic loads. Degree of cross-linking > 60%.

Both pipe types, that is PEXC and PERT are made in a five-layer construction. This means that the EVOH antidiffusion coating, which protects the system against ingress of oxygen into the pipeline, is made as an inner layer covered with an additional layer of PE-Xc or PE-RT polyethylene.

The barrier made of EVOH (Ethylene vinyl alcohol) meets the requirements of DIN 4726 (penetrability < 0,10 g $O_2/m^3 \times d$). Pipes with EVOH layer may also be used in potable water installations.



Cross-section of PERT pipe with EVOH layer



Cross-section of PEXC pipe with EVOH layer

Physical properties of PERT, PEXC

Property	Symbol	Unit	PEXC	PERT
Linear elongation coefficient	α	mm/m × K	0,14 (20 °C) 0,20 (100 °C)	0,18
Thermal conductivity	λ	W/m × K	0,35	0,41
Density	ρ	g/cm³	0,94	0,933
Module E	E	N/mm²	600	580
Extension when stretching		%	400	1000
Minimal bending radius	R_{min}		5 × De	5 × De
Internal wall roughness	k	mm	0,007	0,007

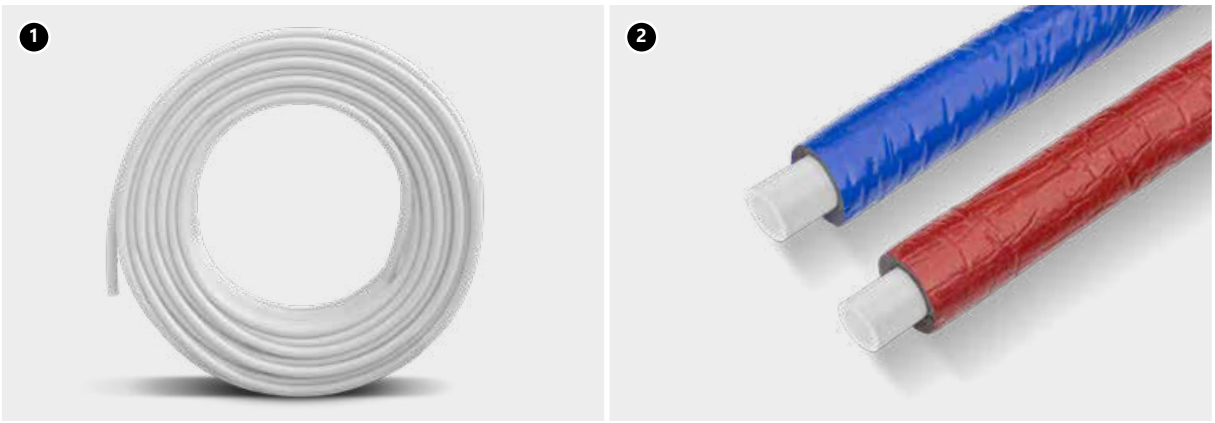
Marking of e.g. PERT pipes

All pipes are marked with permanent descriptions with a 1-m span, containing i. a. the following indications:

Marking description	Example of marking
Name of manufacturer and/or trademark:	KAN, KAN-therm
Nominal external diameter × wall thickness	25 × 3,5
Pipe structure (material)	PE-RT
Pipe code	1129198070
Number of standard or Technical Certificate	EN ISO 21003
Application class/es with design pressure	Class 2/10 bar, Class 5/10 bar
Diffusion marking	Sauerstoffdicht nach DIN 4726
Date of production	18.08.09
Other manufacturer markings, e.g. running meter, batch number	045 m

Notice – other, additional markings, e.g. numbers of certificates (e.g. DVGW) may also be inscribed on the pipe.

2.2 PERT pipes



1. PERT pipes

2. PERT pipes with thermal insulation

Pipe color, packaging

The pipes are supplied in coils in lengths that depend on the pipe diameter and its version, i.e. with or without thermal insulation.

PERT pipe dimension parameters

PERT pipes are offered in types of series: S (pipe series) corresponding to the pressure series PN 20 and PN 12.5.

KAN-therm PERT pipes with anti-diffusion layer Dimensions, weight by unit, water capacity

DN	External diameter × wall thickness	Wall thickness	Internal diameter	S dimension series	Weight by unit	Number in roll	Water capacity
	mm × mm	mm	mm		kg/m	m	l/m
12	12 × 2,0	2,0	8,0	2,50	0,071	200	0,050
14	14 × 2,0	2,0	10,0	3,00	0,085	200	0,079
18*	18 × 2,0*	2,0	14,0	4,00	0,119	200	0,154
18	18 × 2,5	2,5	13,0	3,10	0,125	200	0,133
25	25 × 3,5	3,5	18,0	3,07	0,247	50	0,254
32	32 × 4,4	4,4	23,2	3,14	0,390	25	0,423

* Optional diameter – check the maximum operating conditions of the pipe for a specific application class.

2.3 PEXC pipes

1. PEXC pipe.

2. PEXC pipe with thermal insulation.

Pipe color, packaging

The pipes are supplied in coils in lengths that depend on the pipe diameter and its version, i.e. with or without thermal insulation.

PEXC pipe dimension parameters

PEXC pipes are offered in types of series: S (pipe series) corresponding to the pressure series PN 20 and PN 12.5.

KAN-therm PEXC pipes with anti-diffusion layer Dimensions, weight by unit, water capacity

DN	External diameter x wall thickness	Wall thickness	Internal diameter	S dimension series	Weight by unit	Length of the bar	Water capacity
	mm × mm	mm	mm		kg/m	m	l/m
12	12 × 2,0	2,0	8,0	2,50	0,071	200	0,050
14	14 × 2,0	2,0	10,0	3,00	0,085	200	0,079
18*	18 × 2,0*	2,0	14,0	4,00	0,119	200	0,154
18	18 × 2,5	2,5	13,0	3,10	0,125	200	0,133
25	25 × 3,5	3,5	18,0	3,07	0,247	50	0,254
32	32 × 4,4	4,4	23,2	3,14	0,390	25	0,423

* Optional diameter - check the maximum operating conditions of the pipe for a specific application class.

3 Scope of use

Pipes and connectors in KAN-therm Push system are characterised by compliance with applicable standards, which guarantees a long and trouble-free operation as well as full safety of assembly and usage of the installation.

- **PPSU Push joints:** compliance with PN-EN ISO 15875–3:2005; approved for use by the National Institute of Hygiene,
- **Brass joints and connectors:** compliance with PN-EN 1254–3; approved for use by the National Institute of Hygiene,
- **PERT pipes:** compliance with PN-EN ISO 21003-2; approved for use by the National Institute of Hygiene,
- **PEXC pipes:** compliance with PN-EN ISO 15875–2:2004; approved for use by the National Institute of Hygiene.

Working parameters and scope of use of PEXC, PERT piping installations

			Operating pressure Pop [bar]		Connection type	
Application class (acc. to ISO 10508)	**Top/Tmax [°C]**	**Nominal diameter**	**PEXC**	**PERT**	**Push (sliding sleeve)**	**Threaded**
					PERT PEXC	**PERT PEXC**
Cold tap water	20	12 × 2,0	10	10	+	+
		14 × 2,0	10	10	+	+
		18 × 2,0	10	10	+	+
		18 × 2,5	10	10	+	+
		25 × 3,5	10	10	+	+
		32 × 4,4	10	10	+	+
Hot tap water [class 1]	60/80	12 × 2,0	10	10	+	+
		14 × 2,0	10	10	+	+
		18 × 2,0	10	10	+	+
		18 × 2,5	10	10	+	+
		25 × 3,5	10	10	+	+
		32 × 4,4	10	10	+	+
Hot tap water [class 2]	70/80	12 × 2,0	10	10	+	+
		14 × 2,0	10	10	+	+
		18 × 2,0	10	10	+	+
		18 × 2,5	10	10	+	+
		25 × 3,5	10	10	+	+
		32 × 4,4	10	10	+	+
Low temperature heating, radiant heating [class 4]	60/70	12 × 2,0	10	10	+	+
		14 × 2,0	10	10	+	+
		18 × 2,0	10	10	+	+
		18 × 2,5	10	10	+	+
		25 × 3,5	10	10	+	+
		32 × 4,4	10	10	+	+
Radiator heating [class 5]	80/90	12 × 2,0	10	10	+	+
		14 × 2,0	10	10	+	+
		18 × 2,0	8	8	+	+
		18 × 2,5	10	10	+	+
		25 × 3,5	10	10	+	+
		32 × 4,4	10	10	+	+

Notice!
Design pressures of PERT pipes in a three-layer construction (3W) in accordance with PN-EN ISO 22391–2:2010 in individual application classes can be lower.

Notice

According to ISO 10508, the following application classes are distinguished, in which working temperature parameters are defined for installations (working temperature T_{op}/ maximum temperature T_{max}/ malfunction temperature T_{mal}):

- **1 class** – Hot tap water 60 °C ($T_{op}/T_{max}/T_{mal}$ – 60/80/95),
- **2 class** – Hot tap water 70 °C ($T_{op}/T_{max}/T_{mal}$ – 70/80/95),
- **4 class** – Floor heating, low-temperature heater system 60 °C ($T_{op}/T_{max}/T_{mal}$ – 60/70/100),
- **5 class** – Heater system 80 °C ($T_{op}/T_{max}/T_{mal}$ – 80/90/100).

Working pressure for particular application classes depends on the series of pipes S (types of series by dimensions)

$$S = (d_i - t_n) / 2t_n$$

where d_i – internal diameter of the pipe; t_n – pipe wall thickness

4 PEXC, PERT installation joints

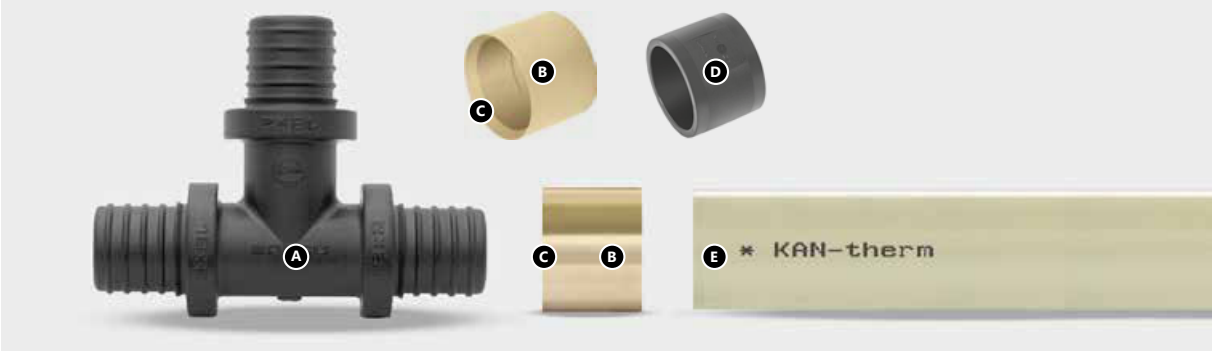
The basic technique of connecting pipes in the KAN-therm Push system is the "Push" crimping technique, based over sliding a brass or plastic ring over the pipe and the the fitting noozle. Such method can also be used to connect pipes to devices and appliances.

4.1 Push joints with rings

Fittings for "Push" connections are universal and can be used with PEXC and PERT pipes Fittings are equipped with special profiled stubs (without additional sealants) inserted into the expanded ending of the pipe, and after that a brass or a plastic (PVDF) ring is slid onto the joint. The pipe is then tightened radially on the stub. Such connection allows conducting installations in construction partitions (in flooring finishing coats and under layers of plaster), without any limitations.

To perform "push" type connections, when using pipes PEXC and PERT and brass fittings and plastic (PPSU) fittings, both brass and plastic (PVDF) sliding ring can be used in any configuration.

4.2 Components of Push joints



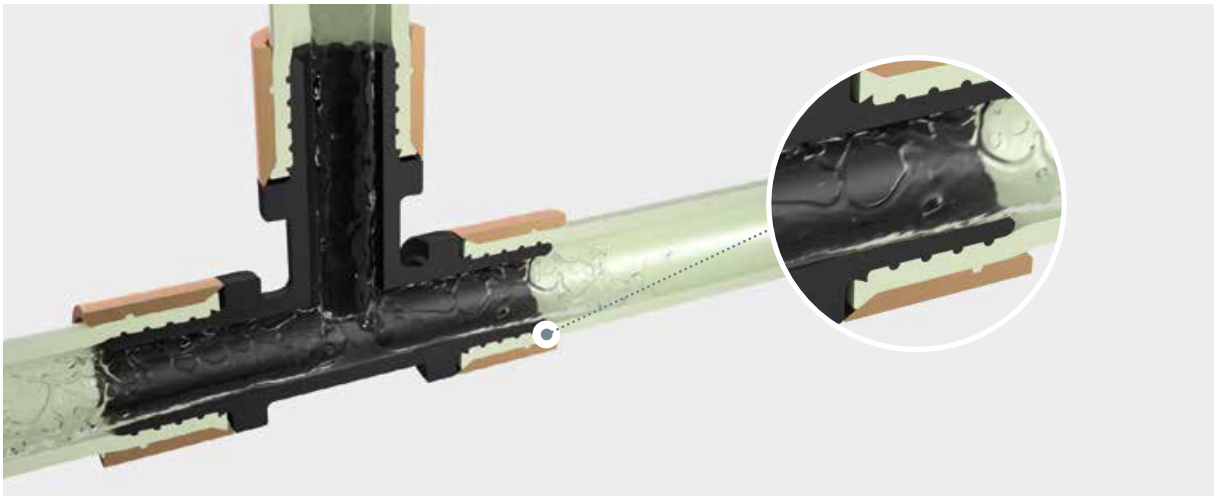
A. Push fitting - PPSU or brass

B. Brass sliding ring - asymmetrical design

C. Chamfered internal edge of the ring

D. PVDF sliding ring - symmetrical design, no need for positioning.

E. PEXC or PERT pipe



Cross-section of a Push joint

4.3 Push fittings

Fittings in the system KAN-therm Push are dedicated to connection of pipes PEXC and PERT with EVOH layer.

KAN-therm Push offer a comprehensive selection of fittings with sliding rings:

- elbows and tees, couplings,
- elbows, tees and other fittings with 15 mm copper nickel-plated pipes for connecting to radiators and fixtures,
- fittings with male and female threads, union adapters,
- tap connections.

Fittings are made of advanced PPSU material or high quality brass.

Push fittings

Push fittings with nickel-plated Cu 15 mm pipes for radiator connections*.

Threaded Push fittings

Push fittings – tap and valve connections*

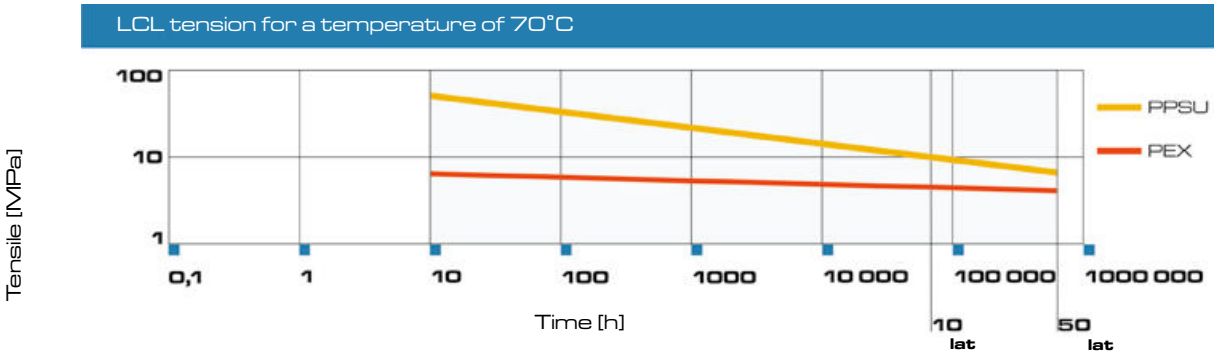
*Methods of connecting radiators and taps using KAN-therm Push system fittings are presented in a separate chapter titled **"Water supply and heating distribution installation joints in the KAN-therm system".**

4.4 PPSU – Perfect installation material

Polyphenylsulfone (PPSU) is a reliable structural material, used to construct installations, f.i. as a building material in joints and fittings, pump enclosures, exchanger elements, components and inserts of intake taps for many years now. In the KAN-therm Push is used to manufacture elbows, tees, couplings and tap connections.

The basic properties of PPSU which determine the possibility of using it as a raw material for the production of fittings and connectors for domestic hot water and central heating installations are:

- its neutral character in contact with water and food, proven by numerous tests carried out by world leading testing institutions (NSF, WRc),
- high resistance to ageing processes as a result of high temperature and pressure impact, allowing for the use of this material in hot tap water and central heating installations and guaranteeing over 50-year life span of our fittings,
- proper resistance to water erosion, even for water with very high chlorine content and very high temperatures,
- no permanent deformations of the material subjected to mechanic impacts in high temperatures, which determines the stability of fittings in time (resistance to material creeping), and thus the tightness of joints,
- high resistance to impacts and mechanic loads,
- small weight compared to metal fittings.



Durability of PPSU fittings is higher compared to plastic pipes

4.5 Contact with substances containing solvents, thread sealants

- Secure the plastic (PPSU) elements of KAN-therm system against contact with paints, primers, solvents or materials containing solvents, e.g. varnish, aerosols, fitting foams, adhesives, etc. In unfavorable circumstances, these substances could potentially damage the plastic components of pipes.
- Make sure that substances sealing the joints, cleaning solutions or solutions used to insulate KAN-therm system components do not contain any compounds which could cause tension fractures. These include ammonia, solutions containing ammonia, aromatic solvents and compounds retaining oxygen (e.g. ketone or ether) or chlorinated hydrocarbons.
- Do not use fitting foams based on methacrylate, isocyanate and acrylate when in contact with plastic (PPSU) elements of KAN-therm system. Avoid direct contact of plastic (PPSU) fittings and pipes with adhesive tapes and adhesives for insulation.
- In threaded fittings, use a proper amount of tow as to leave the ending of the thread bare and visible. Too much tow may disrupt the thread. Winding tow just above the first coil of the thread will prevent the tow from tangling up and the thread from being damaged.
- When making screwed (threaded) connections, precautions should be taken in the form of: using the right amount of sealing material (tow) and correct tightening torque. In unfavorable situations, a threaded connection made with too much sealant and/or overtightened can lead to critical mechanical stresses in the connector material and damage to the product.
- Pay attention to the connection of different types of threads. In unfavorable cases, there may be a collision of the outlines of the female and male threads, which can lead to building up excessive mechanical stress in the fitting material and consequent damage.

Notice!

Do not use chemical sealants or adhesives.

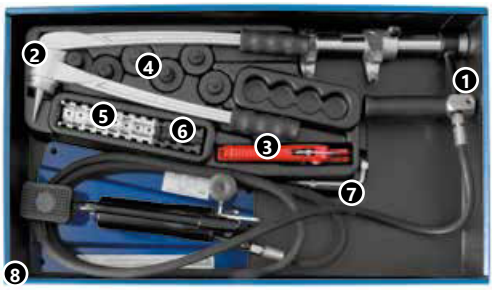
4.6 Execution of Push joints with sliding rings

Tools

Use only original KAN-therm tools to execute all joints in the KAN-therm Push system. The tools are available as single elements or in complete sets.

Before starting any works, please read all instruction manuals for the tools. Instruction manuals are located in tool packs or in tool boxes. A set of tools includes:

- a pipe cutter for PEXC, PERT pipes,
- an expander for pipe (manual or battery-powered),
- a set of expander heads for PEXC and PERT pipes - depending on the type of set,
- manual chain push tool, hydraulic pedal push tool or a battery-powered push tool - depending on the type of set,
- a set of inserts in various configurations, depending on the type of fittings connected (see notice below),
- a tool box.



A set with hydraulic push tool and pedal drive

1. hydraulic push tool with pedal drive
2. pipe expander
3. pipe cutter for PEXC, PERT pipes
4. a set of expander heads (12 × 2; 14 × 2;18 × 2; 18 × 2,5; 25 × 3,5; 32 × 4,4)
5. a set of inserts for slide rings (brass and PVDF) (12, 14, 18, 25) – 2 pieces each
6. a set of inserts for plastic fittings (T12, T14; T18; T25) – 1 piece each
7. an allen key
8. tool box

A set with manual chain push tool

1. manual chain push tool
2. pipe expander
3. PEXC, PERT pipe cutter
4. a set of expander heads (12 × 2; 14 × 2; 18 × 2; 18 × 2,5; 25 × 3,5; 32 × 4,4)
5. a set of inserts for slide rings (brass and PVDF) (12, 14, 18, 25) – 2 pieces each
6. a set of inserts to plastic fittings (T12, T14, T18, T25) – 1 piece each
7. two pairs of forks for connecting the following diameters: 12-18 mm and 25-32 mm
8. tool box

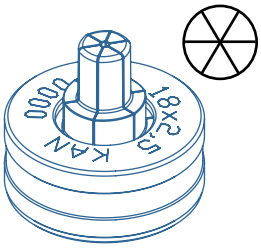
A set with battery-powered push tool

1. Battery-powered push tool – 1 piece
2. Battery-powered expander – 1 piece
3. Battery (standard) – 2 pieces
4. Charger – 1 piece
5. Tool box – 1 piece
6. ultraPRESS insert box – 1 piece
7. a set of inserts to plastic fittings (T12, T14, T18, T25) – 1 piece each
8. a set of inserts for slide rings (brass and PVDF) (12, 14, 18, 25) - 2 pieces
9. Expander head 12 × 2, 14 × 2, 18 × 2, 18 × 2,5, 25 × 3,5, 32 × 4,4 – (1 piece each).
10. Grease for expander

Expanding heads

Expanding heads KAN-therm Push, dedicated to pipes PEXC and PERT, are made of six, specially designed, seperate segments. Their combined and co-ordinate action provide the right expanding of the pipe end when using "THREE STEPS" technique.

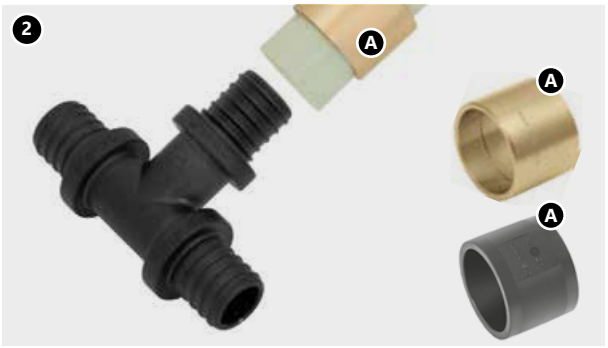
"THREE STEPS"



"THREE STEPS" technique is based on three step pipe expansion.

The expanding heads KAN-therm Push are performed as separate constructions for each of the available pipe range diameters:

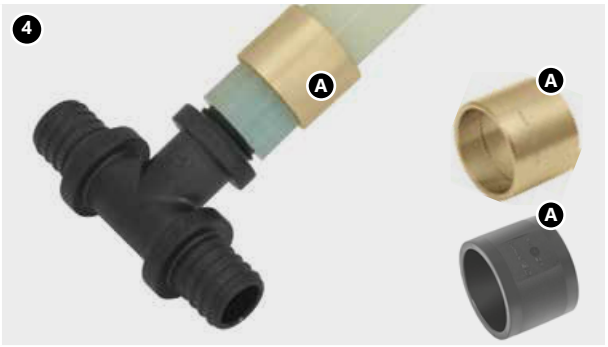
Assembly of Push joints



1. Cut the PEXC, PERT pipe perpendicularly to the axis at a required length, using pipe cutter designed for plastic pipes. Other tools or pipe cutters (also blunt or chipped pipe cutters) are not acceptable.

2. Slide the ring onto the pipe with the chamfered end facing the fitting.

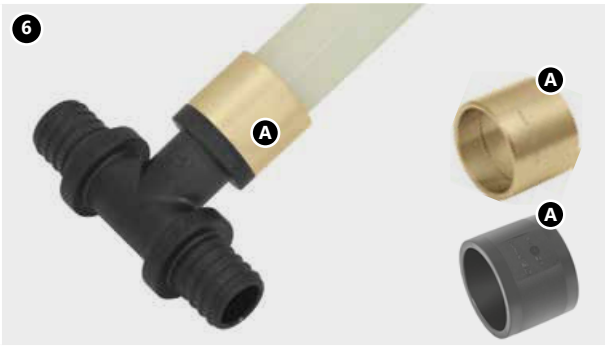
If plastic ring is used, the side of the sleeve is not important.



3. Insert the expanding head fixed on the expander axially into the pipe as far as it will go (full insertion). Expand the pipe with the manual or battery-powered expander. The expansion should be performed in three stages:
I – incomplete expansion, expander rotation by 30°;
II – incomplete expansion, expander rotation by 15°;
III – full pipe expansion.

4. Directly (!) after expanding, slide the fitting into the pipe, up to the last notch on the stub of the fitting (do not push the pipe up to the collar of the fitting). Do not apply lubricants.

⚠ **If the pipe is flared excessively, the pipe material may build up during the connection process. In this case, stop sliding the ring on the pipe in front of the support collar (keep a distance of approx. up to 2 mm from the fitting collar).**



5. Slide the ring using a manual, hydraulic push tool with pedal drive or with battery-powered push tool. Grab fittings only by their collars. Do not slide two rings at the same time.

6. While sliding the ring onto the fitting, observe the assembly process – after sliding the ring up to the collar of the fitting, stop the process. The joint is ready for a pressure test.

7. and **8**. Pay attention to the correct position of the fittings in the fork head of the tool. Failure to comply with this rule may result in overloading of the connection components.

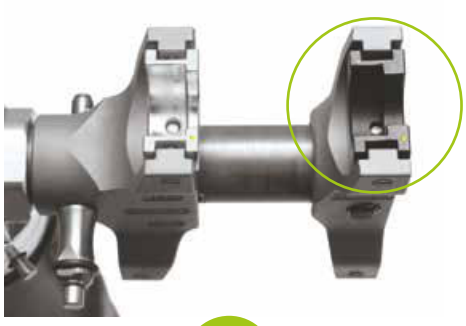
Caution:

When making connections in the Push system, pay special attention to the correct position of the tool heads. Always attach the forks with the inserts to the full depth and at straight angle to the connection being made. Do not move the press tool from side to side while making connections.

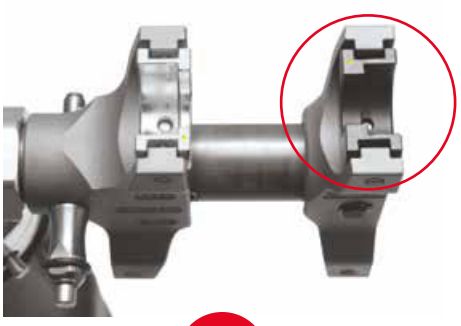
Assembly of PPSU fittings

To mount Ø12, 14, 18, 25 mm fittings made of PPSU, use only black inserts marked with the letter T, at the side of the fitting, and common nickel-plated inserts at the side of the ring (brass or PVDF).

Plastic fitting should be supported by a collar, at which the ring is slid. Do not execute joints with two ring at the same time!

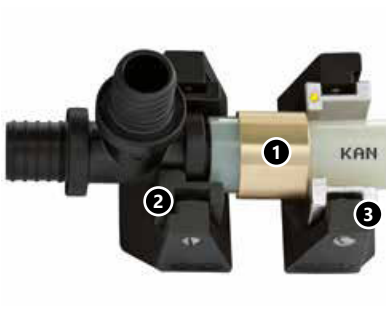


The correct way of assembling the inserts in the forks of the tool
- inserts oriented in one direction
Diameter range 12 to 18 mm



Incorrect way of assembling the inserts in the forks of the tool
- inserts positioned in the opposite direction
Diameter range 12 to 18 mm

Notice!
In order to properly assemble the KAN-therm Push system fittings with the use of a Novopress battery push tool, it is important to properly install the inserts in the forks.

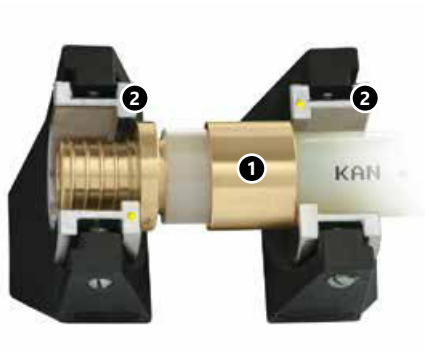


When assembling a Ø32 mm PPSU fitting, use a common nickel-plated Ø25 mm insert at the side of the fitting, and bare push fork (without insert) at the side of the ring.

Assembly of brass fittings

Assembly of brass elements is performed using nickel-plated inserts (with the exception of 32 mm diameters):

- for joints, tees couplings and elbows Ø12, 14, 18, 25 mm apply common nickel-plated inserts.



Brass ring

PVDF ring

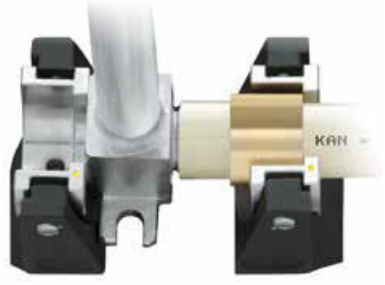
nickel-plated insert

- for brass joints Ø32 mm apply bare forks, without inserts,

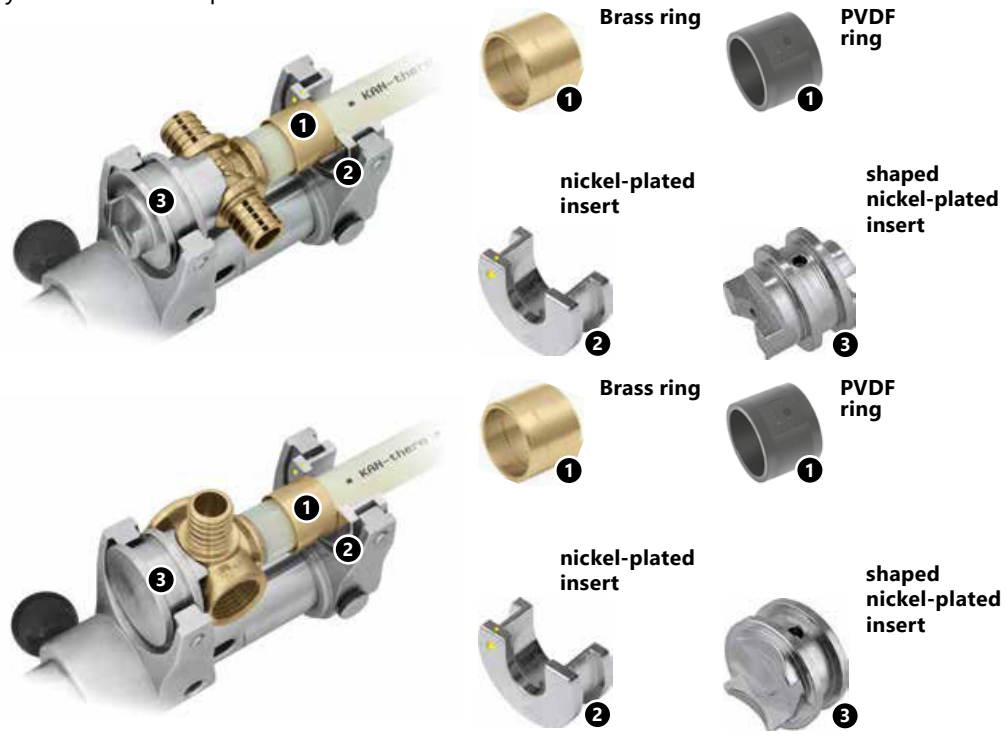
Brass ring

PVDF ring

- assembly of other brass elements (threaded fittings, tap connections with the exception of angle connections) and connections to radiators may be executed with the use of common nickel-plated inserts,



— for short body brass tees (outlet nozzle) 14, 18, 25 mm use shaped nickel-plated inserts. At the side of the ring, apply standard nickel-plated inserts.



Notice Tool sets do not include shaped inserts. Shaped inserts fit only hydraulic push tool with pedal drive.

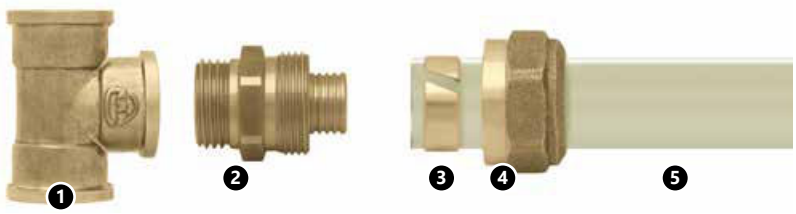
If there is a need to disassemble an installation fragment (incorrectly-executed joint, modernization), there is a possibility of recovering a disassembled fitting (only the brass one). The fitting must be cut out of the installation with fragments of pipes connected to it. Then the joint needs to be warmed with a blow of hot air. After examining the technical condition of the fitting, it may be reused.

KAN-therm PERT, PEXC pipes may be bent with maintaining a radius not smaller than 5 × De (outer dimensions). The first bend may be executed at a distance from the nearest joint at least 10 × De.

Threaded joints (couplings)

Joints in connections of this type are made of brass. A joint consists of a joint body with a stub, which a pipe ending is mounted on, a brass compression ring and a threaded clamping nut.

Such joints are compatible with brass KAN-therm fittings with female threads, such as elbows, tees, tap connections, manifolds without nipples (without fixtures), as well as fixtures with female threads.



Elements of a threaded joint for PERT and PEXC pipes.
1. Fitting – e.g. tee with female thread.
2. Joint body with male thread.
3. Compression ring.
4. Clamping nut.
5. PERT or PEXC pipe.

Joints and fixtures with female threads compatible with threaded joints.

Joins are to be executed in the following order:

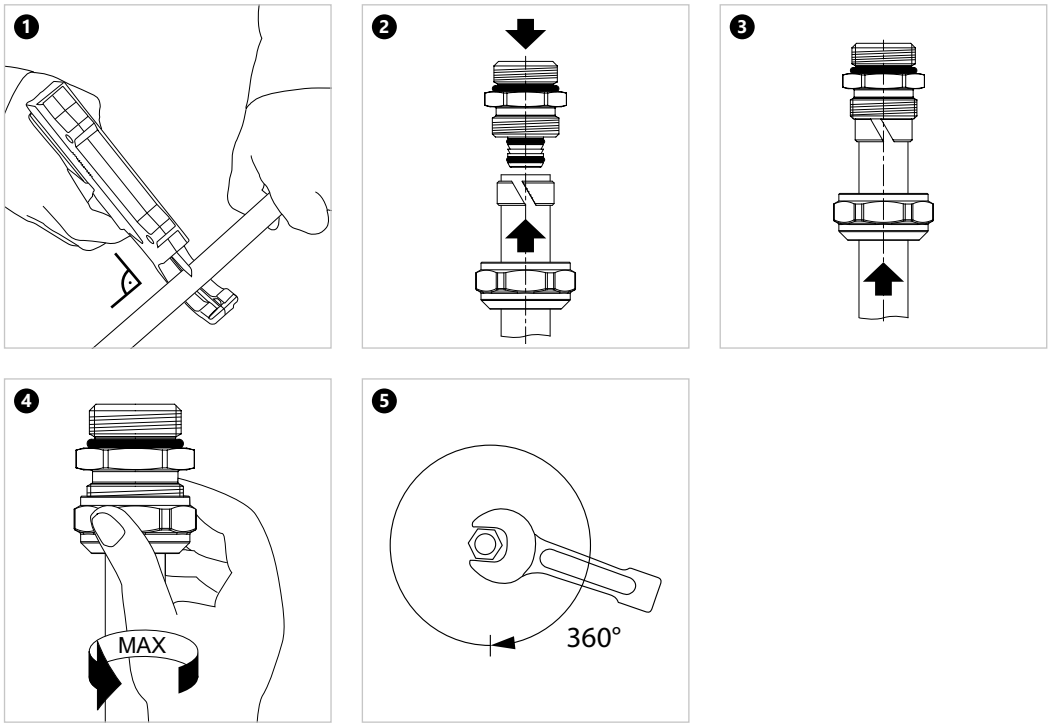
1. Screw the body of the joint into the fitting (fixture), sealing the thread with tow or Teflon tape,

2. Insert the clamping nut onto the pipe, and then mount a ring on the ending of the pipe, whereas the edge of the ring should be located 0,5 to 1,0 mm away from the edge of the pipe,

3. Slide the pipe onto the stub of the fitting until it stops (do not apply any lubricants, do not twist the fitting),

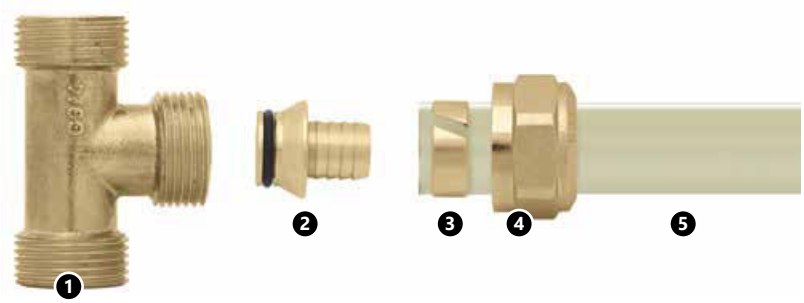
4. Screw the clamping nut on the ring.

Such joint may be disassembled, provided that, after sliding the stub of the fitting out of the pipe, you must cut off the ending of the pipe and execute a new joint afterwards.



Eurocone adapters

It is a variation of threaded joints, in which the basic element is a cone ended stub with O-Ring sealing. Such joint does not require any additional sealants. The joint may be disassembled, provided that the pipe mounted on the stub is not removed.



Elements of a eurocone adapter

1. Fitting – e.g. tee with male thread.
2. Eurocone adapter body (with a black O-Ring)
3. Compression ring.
4. Clamping nut.
5. PERT or PEXC pipe.

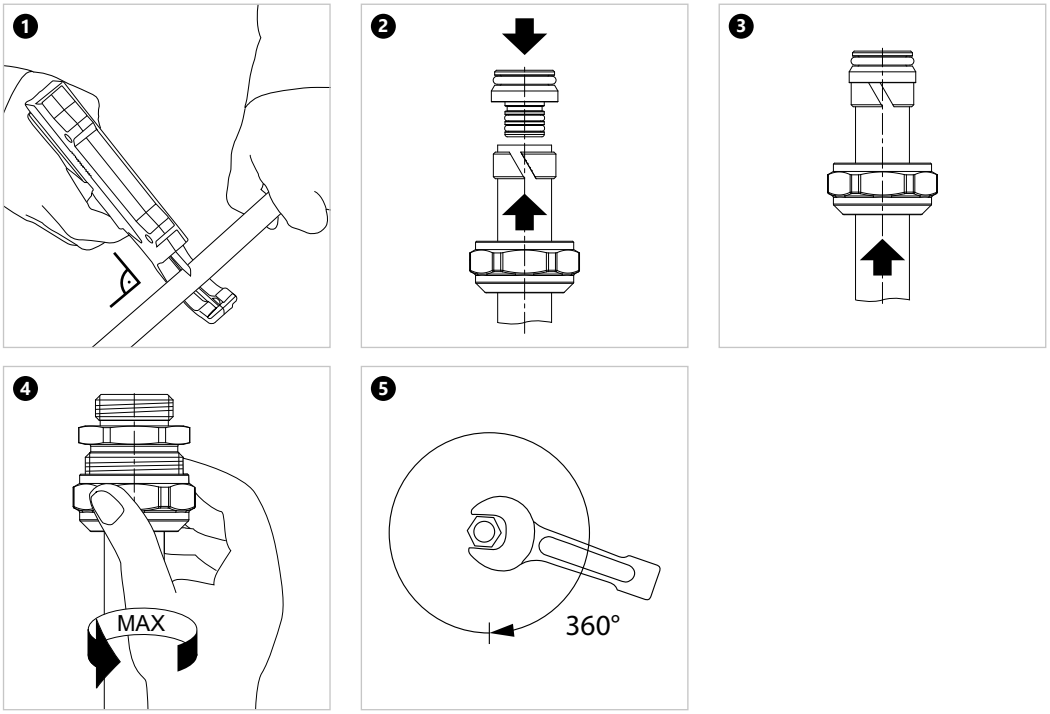
Eurocone adapters are compatible with:

- KAN-therm series of fittings with male threads,
- KAN-therm manifolds equipped with special ¾" nipples,
- combined radiator valves.

Fittings and fixtures with male threads compatible with eurocone adapters.

Notice!

Do not execute threaded joints inside flooring. They must be located in easily accessible places.



5 Transport and storage

The elements of KAN-therm Push system can be stored in temperatures below 0 °C. If that is a case, secure them against mechanical loads.

They should be protected against mechanical damage during transport. Due to the sensitivity to ultraviolet rays, the pipes should be protected against direct long-term exposure to sunlight, both during storage, transport and assembly. KAN-therm Push system elements should be transported by covered means of transport and stored in standard storage facilities in conditions which do not cause deterioration of their quality.

- Do not store in the immediate vicinity of chemicals and sources of ammonia (toilets),
- Do not expose to sunlight (protect from heat and UV radiation),
- Avoid storing near strong heat sources,
- During storage and transport, no contact with sharp objects is allowed,
- Avoid surfaces with sharp edges or loose sharp elements on their surface,
- Do not drag directly on the ground or concrete surface,
- Protect against dirt, mortar, oils, greases, paints, solvents, moisture chemicals, etc.,
- Store and transport in original packaging,
- Remove elements from their original packaging immediately before assembly.

Detailed information about storage and transport of components can be found at en.kan-therm.com.

6 Pressure loss tables

Tab 1. Linear pressure loss in KAN-therm PEXC and PERT pipes for heating water at average temperature 52,5 °C (60/45 °C)

Q [Δt=15 °C] [W]	12 × 2,0		14 × 2,0		18 × 2,5		25 × 3,5		32 × 4,4	
	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]
100	0,03	8	0,02	3	0,01	1				
200	0,06	17	0,04	7	0,02	2	0,01	1		
400	0,13	34	0,08	14	0,05	5	0,03	1		
600	0,19	101	0,12	21	0,07	7	0,04	2	0,02	1
800	0,26	164	0,16	58	0,10	17	0,05	3	0,03	1
1000			0,21	84	0,12	25	0,06	3	0,04	1
1200			0,25	114	0,15	33	0,08	7	0,05	1
1400			0,29	148	0,17	43	0,09	9	0,05	2
1600			0,33	186	0,19	54	0,10	12	0,06	4
1800					0,22	66	0,11	14	0,07	4
2000					0,24	79	0,13	17	0,08	5
2200					0,27	93	0,14	20	0,08	6
2400					0,29	108	0,15	23	0,09	7
2600					0,32	124	0,17	27	0,10	8
2800					0,34	141	0,18	30	0,11	9
3000					0,37	158	0,19	34	0,11	10
3200					0,39	177	0,20	38	0,12	12
3400					0,41	196	0,22	42	0,13	13
3600							0,23	47	0,14	14
3800							0,24	51	0,15	15
4000							0,25	56	0,15	17
4200							0,27	61	0,16	18
4400							0,28	66	0,17	20
4600							0,29	71	0,18	21
4800							0,30	76	0,18	23
5000							0,32	82	0,19	25
5200							0,33	88	0,20	26
5400							0,34	94	0,21	28
5600							0,36	100	0,21	30
5800							0,37	106	0,22	32
6000							0,38	112	0,23	34
6200							0,39	119	0,24	36
6400							0,41	126	0,24	38
6600							0,42	133	0,25	40
6800							0,43	140	0,26	42
7000							0,44	147	0,27	44
7200							0,46	154	0,28	46
7400							0,47	162	0,28	49
7600							0,48	170	0,29	51
7800							0,50	177	0,30	53
8000							0,51	185	0,31	56
8200							0,52	194	0,31	58
8400							0,53	202	0,32	61
8600									0,33	63
8800									0,34	66
9000									0,34	68
9200									0,35	71
9400									0,36	74
9600									0,37	76
9800									0,37	79
10000									0,38	82
11000									0,42	97
12000									0,46	113
13000									0,50	130
14000									0,53	148
15000									0,57	167
16000									0,61	187
17000									0,65	208

Tab 2. Linear pressure loss in KAN-therm PEXC and PERT pipes for heating water at average temperature 60 °C (70/50 °C)

Q [Δt=20 °C] [W]	12 × 2,0		14 × 2,0		18 × 2,5		25 × 3,5		32 × 4,4	
	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]
100	0,02	6	0,02	2	0,01	1				
200	0,05	11	0,03	5	0,02	2				
400	0,10	23	0,06	9	0,04	3	0,02	1		
600	0,15	60	0,09	14	0,05	5	0,03	1		
800	0,19	97	0,12	34	0,07	6	0,04	2	0,02	1
1000	0,24	142	0,15	50	0,09	15	0,05	2	0,03	1
1200	0,29	193	0,19	68	0,11	20	0,06	3	0,03	1
1400			0,22	88	0,13	26	0,07	6	0,04	1
1600			0,25	110	0,15	32	0,08	7	0,05	1
1800			0,28	134	0,16	39	0,09	9	0,05	3
2000			0,31	161	0,18	47	0,10	10	0,06	3
2200			0,34	189	0,20	55	0,11	12	0,06	4
2400					0,22	64	0,11	14	0,07	4
2600					0,24	73	0,12	16	0,07	5
2800					0,26	83	0,13	18	0,08	5
3000					0,27	94	0,14	20	0,09	6
3200					0,29	104	0,15	23	0,09	7
3400					0,31	116	0,16	25	0,10	8
3600					0,33	128	0,17	28	0,10	8
3800					0,35	140	0,18	30	0,11	9
4000					0,37	153	0,19	33	0,11	10
4200					0,38	167	0,20	36	0,12	11
4400					0,40	181	0,21	39	0,13	12
4600					0,42	195	0,22	42	0,13	13
4800							0,23	45	0,14	14
5000							0,24	48	0,14	15
5200							0,25	52	0,15	16
5400							0,26	55	0,16	17
5600							0,27	59	0,16	18
5800							0,28	63	0,17	19
6000							0,29	66	0,17	20
6200							0,30	70	0,18	21
6400							0,31	74	0,18	22
6600							0,32	78	0,19	24
6800							0,32	82	0,20	25
7000							0,33	87	0,20	26
7200							0,34	91	0,21	27
7400							0,35	95	0,21	29
7600							0,36	100	0,22	30
7800							0,37	104	0,22	31
8000							0,38	109	0,23	33
8200							0,39	114	0,24	34
8400							0,40	119	0,24	36
8600							0,41	124	0,25	37
8800							0,42	129	0,25	39
9000							0,43	134	0,26	40
9200							0,44	139	0,26	42
9400							0,45	144	0,27	43
9600							0,46	150	0,28	45
9800							0,47	155	0,28	47
10000							0,48	161	0,29	48
11000							0,53	190	0,32	57
12000									0,34	66
13000									0,37	76
14000									0,40	87
15000									0,43	98
16000									0,46	110
17000									0,49	122
18000									0,52	135
19000									0,55	148
20000									0,57	162
22000									0,63	192

Tab 3. Linear pressure loss in KAN-therm PEXC and PERT pipes for heating water at average temperature 70 °C (80/60 °C)

Q [Δt=20 °C] [W]	12 × 2,0		14 × 2,0		18 × 2,5		25 × 3,5		32 × 4,4	
	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]
100	0,02	5	0,02	2	0,01	1				
200	0,05	10	0,03	4	0,02	1				
400	0,10	20	0,06	8	0,04	3	0,02	1		
600	0,15	58	0,09	12	0,06	4	0,03	1		
800	0,19	93	0,12	33	0,07	6	0,04	2	0,02	1
1000	0,24	136	0,16	48	0,09	14	0,05	2	0,03	1
1200	0,29	185	0,19	65	0,11	19	0,06	4	0,03	1
1400			0,22	84	0,13	25	0,07	5	0,04	1
1600			0,25	106	0,15	31	0,08	7	0,05	2
1800			0,28	129	0,17	38	0,09	8	0,05	3
2000			0,31	155	0,18	45	0,10	10	0,06	3
2200			0,34	182	0,20	53	0,11	11	0,06	3
2400			0,37	212	0,22	61	0,12	13	0,07	4
2600					0,24	70	0,12	15	0,08	5
2800					0,26	80	0,13	17	0,08	5
3000					0,28	90	0,14	19	0,09	6
3200					0,29	101	0,15	22	0,09	7
3400					0,31	112	0,16	24	0,10	7
3600					0,33	123	0,17	27	0,10	8
3800					0,35	135	0,18	29	0,11	9
4000					0,37	148	0,19	32	0,12	10
4200					0,39	161	0,20	35	0,12	10
4400					0,40	174	0,21	37	0,13	11
4600					0,42	188	0,22	40	0,13	12
4800					0,44	203	0,23	44	0,14	13
5000							0,24	47	0,14	14
5200							0,25	50	0,15	15
5400							0,26	53	0,16	16
5600							0,27	57	0,16	17
5800							0,28	60	0,17	18
6000							0,29	64	0,17	19
6200							0,30	68	0,18	20
6400							0,31	72	0,18	22
6600							0,32	75	0,19	23
6800							0,33	79	0,20	24
7000							0,34	84	0,20	25
7200							0,35	88	0,21	26
7400							0,35	92	0,21	28
7600							0,36	96	0,22	29
7800							0,37	101	0,23	30
8000							0,38	105	0,23	32
8200							0,39	110	0,24	33
8400							0,40	115	0,24	34
8600							0,41	120	0,25	36
8800							0,42	125	0,25	37
9000							0,43	130	0,26	39
9200							0,44	135	0,27	40
9400							0,45	140	0,27	42
9600							0,46	145	0,28	43
9800							0,47	150	0,28	45
10000							0,48	156	0,29	47
11000							0,53	184	0,32	55
12000							0,58	214	0,35	64
13000									0,38	74
14000									0,40	84
15000									0,43	95
16000									0,46	106
17000									0,49	118
18000									0,52	131
19000									0,55	144
20000									0,58	157
22000									0,64	186

Tab 4. Linear pressure loss in KAN-therm PEXC and PERT pipes for heating water at average temperature 80 °C (90/70 °C)

Q [Δt=20 °C] [W]	12 × 2,0		14 × 2,0		18 × 2,5		25 × 3,5		32 × 4,4	
	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]
100	0,02	4	0,02	2	0,01	1				
200	0,05	9	0,03	4	0,02	1				
400	0,10	17	0,06	7	0,04	2	0,02	1		
600	0,15	55	0,09	20	0,06	4	0,03	1		
800	0,20	90	0,12	32	0,07	9	0,04	1		
1000	0,24	131	0,16	46	0,09	13	0,05	3	0,03	1
1200	0,29	179	0,19	63	0,11	18	0,06	4	0,03	1
1400			0,22	81	0,13	24	0,07	5	0,04	2
1600			0,25	102	0,15	30	0,08	6	0,05	2
1800			0,28	125	0,17	36	0,09	8	0,05	2
2000			0,31	150	0,18	44	0,10	9	0,06	3
2200			0,34	176	0,20	51	0,11	11	0,06	3
2400			0,37	205	0,22	59	0,12	13	0,07	4
2600					0,24	68	0,13	15	0,08	4
2800					0,26	77	0,13	17	0,08	5
3000					0,28	87	0,14	19	0,09	6
3200					0,30	97	0,15	21	0,09	6
3400					0,31	108	0,16	23	0,10	7
3600					0,33	119	0,17	26	0,10	8
3800					0,35	131	0,18	28	0,11	9
4000					0,37	143	0,19	31	0,12	9
4200					0,39	156	0,20	33	0,12	10
4400					0,41	169	0,21	36	0,13	11
4600					0,43	183	0,22	39	0,13	12
4800					0,44	197	0,23	42	0,14	13
5000							0,24	45	0,15	14
5200							0,25	48	0,15	15
5400							0,26	52	0,16	16
5600							0,27	55	0,16	17
5800							0,28	59	0,17	18
6000							0,29	62	0,17	19
6200							0,30	66	0,18	20
6400							0,31	69	0,19	21
6600							0,32	73	0,19	22
6800							0,33	77	0,20	23
7000							0,34	81	0,20	24
7200							0,35	85	0,21	26
7400							0,36	89	0,21	27
7600							0,37	94	0,22	28
7800							0,38	98	0,23	29
8000							0,39	102	0,23	31
8200							0,40	107	0,24	32
8400							0,40	112	0,24	33
8600							0,41	116	0,25	35
8800							0,42	121	0,26	36
9000							0,43	126	0,26	38
9200							0,44	131	0,27	39
9400							0,45	136	0,27	41
9600							0,46	141	0,28	42
9800							0,47	146	0,28	44
10000							0,48	151	0,29	45
11000							0,53	179	0,32	54
12000							0,58	208	0,35	62
13000									0,38	72
14000									0,41	82
15000									0,44	92
16000									0,46	103
17000									0,49	115
18000									0,52	127
19000									0,55	140
20000									0,58	153
22000									0,64	181
24000									0,70	211

Tab 5. Linear pressure loss in KAN-therm PEXC and PERT pipes for water at temperature 10 °C

q [l/s]	12 × 2,0		14 × 2,0		18 × 2,5		25 × 3,5		32 × 4,4	
	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]
0,01	0,20	130	0,13	53	0,08	19	0,04	5	0,02	2
0,02	0,40	471	0,25	166	0,15	49	0,08	11	0,05	3
0,03	0,60	931	0,38	326	0,23	95	0,12	21	0,07	6
0,04	0,80	1521	0,51	529	0,30	154	0,16	34	0,09	10
0,05	0,99	2233	0,64	774	0,38	224	0,20	49	0,12	15
0,06	1,19	3063	0,76	1059	0,45	306	0,24	66	0,14	20
0,07	1,39	4008	0,89	1381	0,53	398	0,28	86	0,17	26
0,10	1,99	7509	1,27	2570	0,75	735	0,39	157	0,24	48
0,13	2,59	11977	1,66	4077	0,98	1160	0,51	247	0,31	74
0,14			1,78	4648	1,05	1320	0,55	280	0,33	84
0,15			1,91	5252	1,13	1489	0,59	316	0,35	95
0,20			2,55	8774	1,51	2472	0,79	521	0,47	156
0,21					1,58	2695	0,83	567	0,50	169
0,22					1,66	2926	0,86	615	0,52	184
0,25					1,88	3673	0,98	769	0,59	229
0,27					2,03	4213	1,06	881	0,64	262
0,30							1,18	1060	0,71	315
0,35							1,38	1393	0,83	413
0,40							1,57	1766	0,95	522
0,45							1,77	2178	1,06	643
0,50							1,96	2630	1,18	774
0,55							2,16	3120	1,30	917
0,60									1,42	1071
0,65									1,54	1235
0,70									1,66	1410
0,75									1,77	1595
0,80									1,89	1791
0,85									2,01	1997

Tab 6. Linear pressure loss in KAN-therm PEXC and PERT pipes for water at temperature 60 °C

q [l/s]	12 × 2,0		14 × 2,0		18 × 2,5		25 × 3,5		32 × 4,4	
	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]
0,01	0,20	107	0,13	37	0,08	7	0,04	2	0,02	1
0,02	0,40	349	0,26	121	0,15	35	0,08	8	0,05	2
0,03	0,61	706	0,39	244	0,23	70	0,12	15	0,07	5
0,04	0,81	1172	0,52	402	0,31	115	0,16	25	0,10	7
0,05	1,01	1741	0,65	595	0,38	170	0,20	36	0,12	11
0,06	1,21	2411	0,78	821	0,46	233	0,24	50	0,14	15
0,07	1,42	3179	0,91	1079	0,54	306	0,28	65	0,17	19
0,10	2,02	6066	1,30	2044	0,77	575	0,40	121	0,24	36
0,13			1,68	3284	1,00	918	0,52	192	0,31	57
0,14			1,81	3757	1,07	1049	0,56	219	0,34	65
0,15			1,94	4260	1,15	1187	0,60	247	0,36	73
0,20			2,59	7216	1,53	1997	0,80	412	0,48	122
0,21					1,61	2182	0,84	450	0,51	133
0,22					1,69	2374	0,88	489	0,53	144
0,25					1,92	2998	1,00	615	0,60	181
0,27					2,07	3451	1,08	707	0,65	207
0,30							1,20	855	0,72	250
0,35							1,40	1130	0,84	330
0,40							1,60	1441	0,96	420
0,45							1,80	1787	1,08	519
0,50							2,00	2167	1,20	629
0,55									1,32	747
0,60									1,44	876
0,65									1,56	1013
0,70									1,68	1160
0,75									1,80	1316
0,80									1,92	1482
0,85									2,05	1657

Tab 7. Linear pressure loss in KAN-therm PEXC and PERT pipes for 50% ethylene glycol at average temp. 9,5 °C (7/12 °C)

Q [Δt=5 °C] [W]	12 × 2,0		14 × 2,0		18 × 2,5		25 × 3,5		32 × 4,4	
	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]	v [m/s]	R [Pa/m]
100	0,11	297	0,07	122	0,04	43	0,02	12	0,01	4
200	0,23	594	0,15	243	0,09	85	0,05	23	0,03	8
400			0,29	487	0,17	170	0,09	46	0,05	17
600					0,26	256	0,14	70	0,08	25
800					0,35	341	0,18	93	0,11	34
1000							0,23	116	0,14	42
1200							0,27	139	0,16	50
1400							0,32	162	0,19	59
1600							0,36	185	0,22	67
1800							0,41	209	0,25	76
2000							0,45	232	0,27	84
2200							0,50	255	0,30	92
2400							0,54	278	0,33	101
2600									0,35	109
2800									0,38	118
3000									0,41	126
3200									0,44	134
3400									0,46	143
3600									0,49	260
3800									0,52	285

NOTES

KAN-therm MULTISYSTEM

Complete multipurpose installation system consisting of modern, mutually complementary technical solutions for pipe water distribution, heating and cooling installations, as well as technological and fire extinguishing ones.

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